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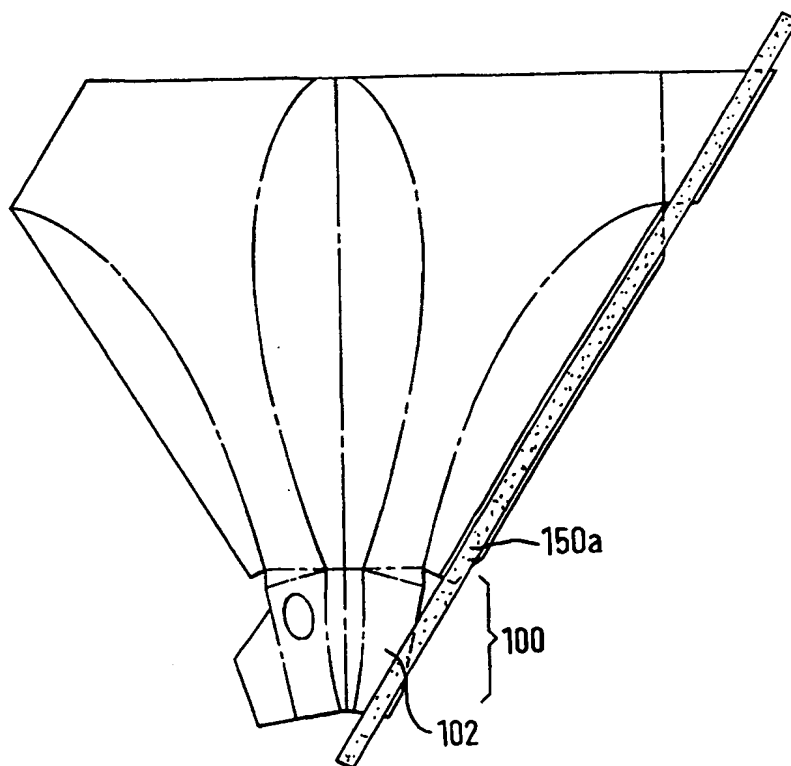
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(54) Title: ACOUSTIC HORN

(57) Abstract

A folded structure (and a blank of sheet material) capable of being folded to said structure is provided which structure is an acoustic horn comprising an acoustic horn comprising a tapered structure having a base end and an apex end, the tapered structure being formed from a sheet of foldable material, and comprising a wall member having a plurality of fold lines defining the edges of a plurality of juxtaposed panels, characterised in that at least two of the fold lines (73, 74) are arcuate to form a non-planar panel (55) bound by said arcuate fold lines both base end (51) and apex end (52) being open. The structure provides an inexpensive party product which can easily be shaped in flat form but provides pleasing acoustical properties.



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ACOUSTIC HORN

This invention relates to an acoustic horn which, amongst other things, may be used as a musical instrument. Such a structure can be formed from a sheet of foldable material. The invention also relates to a blank of foldable sheet material for forming the tapered structure.

In the field of acoustics, horns are generally classified according to their geometrical shape. Figure 1 shows, for example, a pyramidal horn with an open rectangular base, and a tubular wall comprising four planar trapezoidal shaped panels. The apex of the pyramid is truncated to form a throat section through which acoustic energy may be transmitted or received.

Figure 2 shows a conical horn in which the tubular wall forms a continuous panel circumscribing an acoustic channel within. The geometrical structures shown in Figures 1 and 2 are characterised by their cross-sectional area increasing linearly with the distance from their throat. These structures, by virtue of their shape, may be formed from a single sheet of foldable material. The blank for the pyramidal horn is shown in Figure 4, with the four panels labelled 41, three fold lines labelled 42, and a tab for holding the structure together labelled 43.

Figure 3 shows a sectoral horn in which one of the sets of two opposing panels are planar and parallel, and the other set of opposing panels are flared. This particular structure is characterised by the cross-sectional area increasing non-linearly with the distance from the throat. This non-linearity of the cross-sectional area improves the efficiency of the horn structure in channelling acoustic energy to or from the throat. However, whereas the shape of the structures of Figures 1 and 2 enable them to be formed from a sheet of foldable material, the geometrical structure of Figure 3 must be formed by fastening together the separate panels.

French Patents FR-A-2763736 (published Nov. 27, 1998), FR-A-319520 and US 1353864 disclose conical horns as illustrated in Fig. 2 of the present application.

5

German Patent DE-A-2040787 discloses a generally conical trumpet with panel structure but no arcuate structure. UK Patent GB-A-519577 discloses a container structure with non planar elements but not an acoustic structure or arcuate features. French Patent FR-A-1066361 discloses a carton with arced panels but not an acoustic horn. US Patent US-A-4166565 discloses a carton with a arcuate panel but with sealed ends and there is no disclosure of acoustic properties.

15 According to a first aspect of the present invention there is provided an acoustic horn comprising a tapered structure having a base end and an apex end, the tapered structure being formed from a sheet of foldable material, and comprising a wall member having a plurality of fold lines defining the edges of a plurality of juxtaposed panels, characterised in that at least two of the fold lines are arcuate to form a non-planar panel bound by said arcuate fold lines both base end and apex end being open.

25 A structure, in accordance with the present invention has an advantage that it by using curved fold lines instead of straight fold lines as used in the pyramidal horn, a panel or panels of the structure may be made non-planar. The use of curved interfaces between adjacent panels enhances the strength of the structure, in particular its ability to withstand sheering and crushing forces.

The structure has a base end and an apex end, also referred to as the mouth and the throat respectively. Both of these ends must be open to provide an acoustic horn.

35

Specifically an internal channel is provided to enhance the acoustic properties.

In a preferred embodiment, at least one pair of the curved fold lines converge towards the apex end, and may contribute to the general convergence of the tapered structure i.e. the decrease in the cross-sectional area towards the throat.

Preferably at least one pair of the curved fold lines converges towards the base end of the tubular wall. In this case, the curved fold lines may converge to a point at or near the base end.

Ideally, at least one non-planar panel has a concave external appearance, and has mirror symmetry in a plane substantially perpendicular to the panel.

Advantageously, the wall member may include a second non-planar panel, opposite the first non-planar panel, and also having a concave external appearance. The first and second panels may be of different size and one or both may stop short of the base. Advantageously fold lines may be disposed in the non-planar panels, thereby allowing the tapered structure to be folded flat. This is advantageous for transport and storage.

The wall member may include two further opposing non-planar panels, joining the first and second non-planar panels, and having a generally convex external appearance.

A preferred embodiment of the invention has first and second non-planar panels which are generally elliptically shaped. Alternatively, the first and second non-planar panels may be regarded as being generally petal shaped. In a further embodiment, the first and second non-planar panels may be regarded as being generally trapezoidal shaped with the non-parallel sides being curved.

The acoustic horn may advantageously have a cross-sectional area which varies non-linearly (generally increasing) with the distance from the throat.

5

An internal channel may be formed within the horn. The channel may carry a vibrating element. It is thus possible to form a kazoo within the horn.

10 Preferably the channel is integrally formed with the horn. The channel may be formed by folding a portion of the sheet of foldable material.

Advantageously at least one orifice or notch may be cut into a
15 wall of the internal channel in order to support the vibrating element. The vibrating element may, for example, be formed from a thin paper, plastics or metal sheet and which can be forced into vibration when a user modulates a flow of air into the horn with their own vocal cords. In a preferred
20 embodiment the foldable material is laminated and the laminating material extends over the orifice or notch to form the vibrating element. A tab can be left in the material of the orifice and removed prior to final assembly.

25 Advantageously a single line of adhesion may be provided for glue and/or sticky tape such that the tapered structure can be formed from the unfolded blank of material in a relatively easy folding operation. Advantageously the line of adhesion is a straight line.

30

According to a second aspect of the present invention, there is provided a tapered structure comprising at least first, second and third wall portions, wherein the wall portions co-operate in use, to form a channel, and wherein the second
35 portion is intermediate the first and third portion, is bounded by two arcuate curves, and has an outwardly concave surface.

According to a third aspect of the present invention there is provided a sheet of material having three pairs of fold lines formed therein, wherein each pair of fold lines are arcuate and serve to define five portions, and in which the lines in
5 each pair curve so as to define three tongue shaped portions, separated by intervening regions.

The present invention will further be described, by way of example, with reference to the accompanying drawings, in
10 which:

Figures 1 to 4 are illustrative of the acoustic devices of the art.

15 Figure 1 is a perspective view of a pyramidal horn;

Figure 2 is a perspective view of a conical horn.

Figure 3 is a perspective view of a sectoral horn.

20

Figure 4 is a plan view of a blank for the pyramidal horn of Figure 1.

Figures 5a, 5b, 5c and 5d are views of a first embodiment of a
25 tapered structure in accordance with the invention in various orientations;

Figure 6 is a perspective view of a second embodiment of a tapered structure in accordance with the invention;

30

Figure 7 is a plan view of a blank for the tapered structure of figure 6;

Figure 8 is a plan view of a blank for the tapered structure
35 of Figures 5a, 5b, 5c and 5d;

Figures 9a and 9b are end and exploded views of the throat of a tapered structure constituting a third embodiment of the invention.

- 5 Figure 10 shows part of the blank for the tapered structure of Figures 9a and 9b;

- Figure 11 illustrates a blank for a fourth embodiment of the invention having a modified panel shape so as to define a
10 linear line of adhesion;

Figure 12 illustrates a blank of Figure 11 with a linear glue line in place;

- 15 Figure 13 illustrates a blank for a fifth embodiment of the invention, having a linear line of adhesion along one edge of the blank, with a glue line in place along the line of adhesion;

- 20 Figure 14 illustrates a portion of the blank for a modified version of the internal channel structure; and

Figure 15 illustrates a variation of the embodiment of Figure 13 viewed from the other side of the blank.

25

Referring to Figures 5a, 5b, 5c and 5d there is shown a horn structure which is formed by folding a sheet of material. The material may be any foldable material, such as paper, card, suitably thin sheet metal, or plastics.

30

The horn structure has a single wall which is wrapped around a channel or cavity, and joins back onto itself to form a hollow tube-like structure. The horn has an open base end 51, known as the mouth, having a relatively wide cross-sectional area.

35

The cross-sectional area of the channel decreases along the length of the horn, at least from pyramidal region 59, to an open truncated apex end 52, otherwise known as the throat of

the horn. The horn has first and second opposed concave surfaces 54 and 55, respectively. Each surface 54 and 55 is provided with respective longitudinally extending fold lines, as indicated by the chain lines 58. Thus the surface 54 is
5 divided into portions 54a and 54b (see Fig. 8). The first concave surface 54 extends from the throat 52 to the mouth 51 of the horn. The second concave surface 55 only extends part of the way towards the mouth 51. This results in the creation of the pyramidal region 59 where the second concave surface
10 and the opposed side walls 60 and 61 come together. This pyramidal region imparts structural stability into the horn.

The horn can be moved between a flat and a 3-dimensional state at will. This does involve some stressing of the material of
15 the horn, which "clicks" into its final state as the horn is constructed from the flat to the 3-dimensional form. This sudden change into the final 3-dimensional state also enhances the structural rigidity of the horn and inhibits the horn from inadvertently returning to the flat state. Of course, the
20 horn may be provided without the fold lines 58 if it is not to be folded flat.

Referring also to Figure 8, there is shown a blank for the horn structure of Figures 5a to 5d. The blank is delimited by
25 an outline 71, and has four fold lines 72, 73, 74, 75 which divide the blank into three generally elliptical areas 76, 78, 80, albeit being truncated at one end, and first and second intermediate areas 77, 79. There is also a flap or tab section 81 joined by a fold line to the first intermediate
30 area 77. After folding the blank along the fold lines, the blank is then wrapped around onto itself such that the outer elliptical areas 76 and 80 coincide or overlap, and the flap section 81 overlaps with the area 79. With the blank folded and wrapped the horn structure of Figures 5a to 5d is formed,
35 and may remain in that form by gluing or fastening both the overlapping elliptical areas 76 and 80, and the overlapping flat 81 and area 79 to one another in a known manner. The

elliptical area 78, and the coincident elliptical areas 76 and 80 form two opposing concave panels of the horn. These panels are joined by two opposing convex panels formed by the intermediate areas 77, 79. The curved nature of the fold lines, which convergence towards the base end, combined with the arc or sector like symmetrical shape of the overall blank produce a horn structure which is flared i.e. the cross-sectional area of the horn increases non-linearly with the distance from the throat. This improves the acoustic performance of the horn.

The first generally elliptical area may be provided as only a half elliptical area by removing a portion 76' therefrom, thus causing the edge of the blank to be delimited by line 71' in that portion of the blank.

Figure 6 shows an alternative embodiment of the horn structure in accordance with the invention, in which the base end is symmetric. The blank for this horn structure is shown in Figure 7, with like references referring to like features. This blank does not include the flap or tab 81 of the Figure 8 embodiment.

It is possible to form a musical instrument, such as a kazoo, integrally with the horn. As shown in Figures 9a and 9b, an internal channel 100 can extend forwardly within the throat section of the horn. Figures 9a and 9b show the horn in a state intermediate its flat and fully constructed forms in order that the separation between the various elements can be more clearly shown. The channel comprises first and second walls 102 and 104 which are hingedly attached together along a longitudinally extending line 106. The walls 102 and 104 do not include fold lines therein. In its fully constructed state, the top of the channel 100 is defined by a further wall 108 which is composed of two wall portions 108a and 108b separated by a fold line. In the fully constructed state the walls 108a and 108b follow the same path, at least partially,

as the panel 54 of the completed horn. The wall portions 108a and 108b extend immediately from the fold line 58. At the apex the walls 102 and 104 are separated from the first and second intermediate regions 77 and 79 by first and second triangular portions 112 and 114 which serve to form end walls which, in use, close the throat of the horn and ensure that air flow into the interior of the horn has to occur via the internal channel 100. One of the walls 102 and 104 of the internal channel carries a flap 116 which, in use, is adhered to the other one of the walls 102 and 104 thereby ensuring that the channel is formed. Additionally, one of the walls of the channel has an aperture or orifice formed therein for supporting a vibrating element 118 which forms the acoustically active part of the kazoo. The horn may be laminated to protect it and the laminating material, for example a plastics film, may extend over the aperture in the wall of the channel so as to form the vibrating element. In this Figure and the following Figures 7-14 the blank is viewed from the side bearing the plastic laminate.

20

The arcuate crease lines 72, 73, 74, 75 impart a tension and rigidity to the walls of the horn which decreases the absorption of vibrations by the walls and enhances the application of the tapered structure as a noise maker or musical instrument.

25

In a further modification, panels 130 and 131 are provided to define part of the path of a glue line 150 which runs diagonally across the blank, as shown in Figure 12. The panels 108a and 108b are also modified so as to form foldable portions 132 and 134, respectively, which lie on the path of the glue line.

30

In use, the end portion 140 is folded under the remainder of the horn, and the portions 132 and 134 are also folded back, thereby providing means for adhering the end portion 140 in position. The flap 138 is adhered to the corresponding

35

portion 138a of the glue line. Similarly flap 136 is adhered to portion 136a, flap 130 to portion 130a, and flap 131 to portion 131a.

5 Thus the completed structure can be easily assembled, especially so when the glue line can be provided by double sided adhesive tape. The tape may be cut away in those portions where it is not overlying the blank.

10 Another embodiment having an adhesive line is shown in Figure 13 in which the channel section 100 is shorter than in the embodiment of Figures 10 to 12, and the adhesive line 150a is along one edge of the blank eliminating flap 138 rather than crossing the channel section as in Figure 12. This has
15 advantages in the manufacture of the blank and the assembly of the tapered structure.

In Figure 14 there is shown a variation of the internal channel structure of Figure 13. The glue line 150b runs
20 across the corner of flap 102 to create a glue area corresponding to a foldable corner 151 on flap 104a eliminating flap 136 from the embodiment of Figures 13 and 14. This simplifies construction.

25 Small holes 144 as shown in Figure 11 may also be provided through which a cord or similar may be threaded (either before or after construction of the horn) to create a carrying loop, which may be a neck cord.

30 In Figure 15 the blank is viewed from the un laminated side. As will be seen this results in a folded structure in which the flap 104b carries a flap 116a the edge of which is visible after assembly.

35 It is thus possible to form a structurally complex shape, comprising a kazoo and an acoustic horn from a single sheet of material, with the exclusion of the vibrating element, and

only requiring three fastenings, for example by glue, to be made. Furthermore, the instrument can fold flat for easy transport.

- 5 It will be evident in view of the foregoing that various modifications may be made within the scope of the present invention. For example, there may be more than two, e.g. 3 or 4, concave elliptical panels distributed around the tubular wall member.

CLAIMS:

1. An acoustic horn comprising a tapered structure having a base end (51) and an apex end (52), the tapered structure being formed from a sheet of foldable material, and comprising a wall member having a plurality of fold lines (72,73,74,75) defining the edges of a plurality of juxtaposed panels (76,78,80), characterised in that at least two of the fold lines (73,74) are arcuate to form a non-planar panel (55) bound by said arcuate fold lines both base end (51) and apex end (52) being open.
2. An acoustic horn according to claim 1 wherein the structure further comprises an internal channel (100) within the acoustic horn.
3. An acoustic horn according to either of claims 1 and 2 wherein the tapered structure has a cross-sectional area which increases non-linearly with distance from the apex end (52).
4. An acoustic horn as claimed in any one of claims 1 to 3, wherein at least one pair of the arcuate fold lines converges towards the apex end (52) to contribute to a general convergence of the tapered structure.
5. An acoustic horn as claimed in any one of claims 1 to 4, wherein at least one pair of the arcuate fold lines (73,74) converges towards the base end (51) of the structure such that the arcuate fold lines (73, 74) converge to a point (59) at or near the base end (51).
6. An acoustic horn as claimed in any one of the preceding claims, wherein the non-planar panel (55) is outwardly concave and has mirror symmetry about a longitudinal axial plane substantially perpendicular to the panel (55).

7. An acoustic horn as claimed in any one of claims 1 to 6, wherein the wall member includes a second non-planar panel (54), opposed to the first non-planar panel (55), which second non-planar panel (54) is also outwardly concave.

5

8. An acoustic horn as claimed in any one of the preceding claims, wherein the first and second panels (54,55) are of different size from each other and one or both converge to a point (59) proximate the base end (51).

10

9. An acoustic horn as claimed in any of the preceding claims, wherein fold lines (58) are disposed in the at least one non-planar panel (54,55), thereby allowing the tapered structure to be folded flat.

15

10. An acoustic horn as claimed in any of the preceding claims, wherein the wall member includes two further opposing non-planar panels (77,79), joining the first and second non-planar panels (54,55), and being generally outwardly convex.

20

11. An acoustic horn as claimed in any of the preceding claims, wherein the first and second non-planar panels (54,55) are generally elliptically shaped.

25

12. An acoustic horn as claimed in any of claims 1 to 10, wherein the first and second non-planar panels (54,55) are generally petal-shaped.

30

13. An acoustic horn as claimed in any one of claims 1 to 10, wherein the first and second non-planar panels (54,55) are generally trapezoidal shaped with the non-parallel sides (71,72,73,74) being arcuate.

35

14. An acoustic horn as claimed in any one of claims 2 to 13, wherein the internal channel (100) is integrally formed with the tapered structure.

15. An acoustic horn as claimed in any one of claims 2 to 14, wherein the internal channel (100) is formed by folding a portion of the sheet of foldable material.
- 5 16. An acoustic horn as claimed in any one of claims 2 to 15, wherein at least one orifice or notch is formed in a wall of the internal channel (100) to support a vibrating element (118).
- 10 17. An acoustic horn as claimed in claim 16, wherein the vibrating element (118) is formed from a thin paper, plastics or metal sheet for being forced into vibration when a user modulates a flow of air into the horn.
- 15 18. An acoustic horn as claimed in claims 16 and 17, wherein the foldable material is laminated and the laminating material extends over the orifice or notch to form the vibrating element (118).
- 20 19. An acoustic horn as claimed in any of the preceding claims where the structure generally comprises two flat planar portions being joined at opposed edges of the flat structure.
- 25 20. An acoustic horn as claimed in claim 19, wherein a single adhesive line (13) is provided such that the two flat planar portions can be held together when formed from one or more sheets of foldable material.
- 30 21. An acoustic horn as claimed in claim 19, wherein the line of adhesion (130) is a straight line.
- 35 22. An acoustic horn as claimed in claims 20 or 21, wherein the adhesive line is located along an edge of the flat structure.
23. An acoustic horn as claimed in any of the preceding claims, wherein the tapered structure comprises at least

first, second and third wall portions, wherein the wall portions co-operate in use, to form a channel, and wherein the second portion, intermediate the first and third portion, is bounded by two arcuate curves, and has an outwardly concave surface.

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24. A blank of foldable sheet material which has fold lines whereby the blank can be folded to the acoustic horn of any one of the claims 1 to 23.

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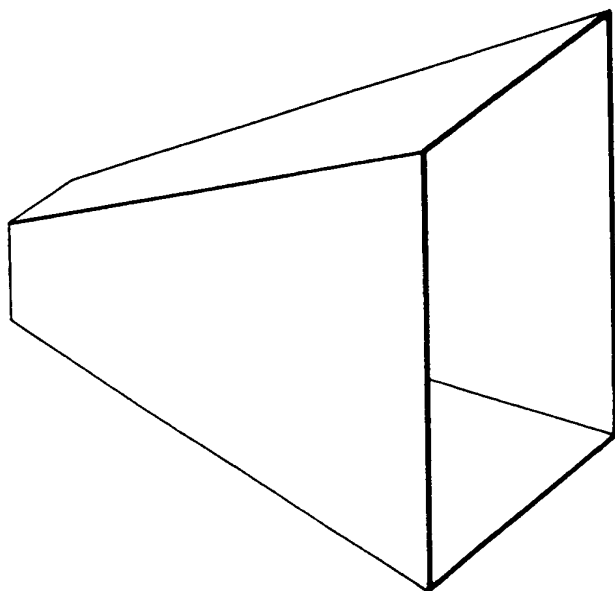


FIG. 1

FIG. 2

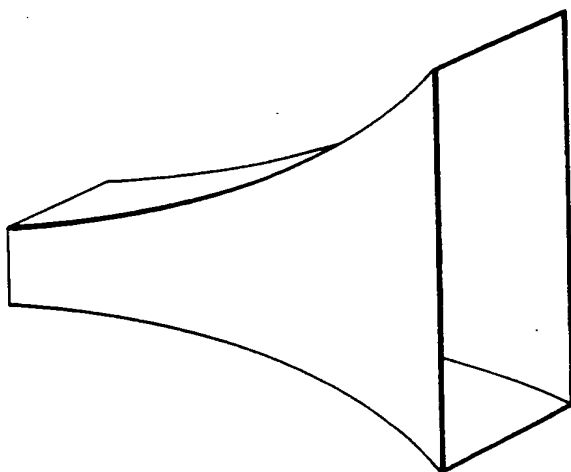
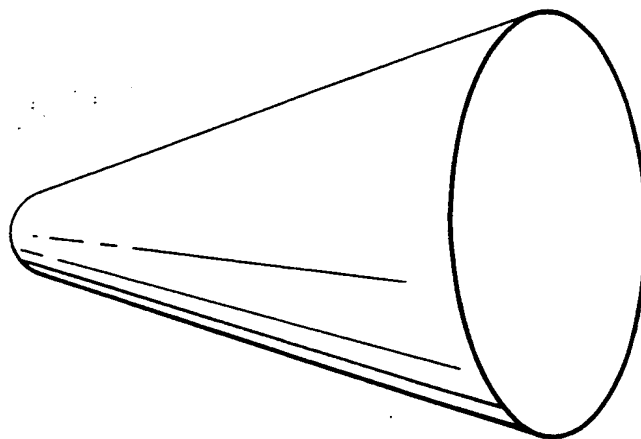


FIG. 3

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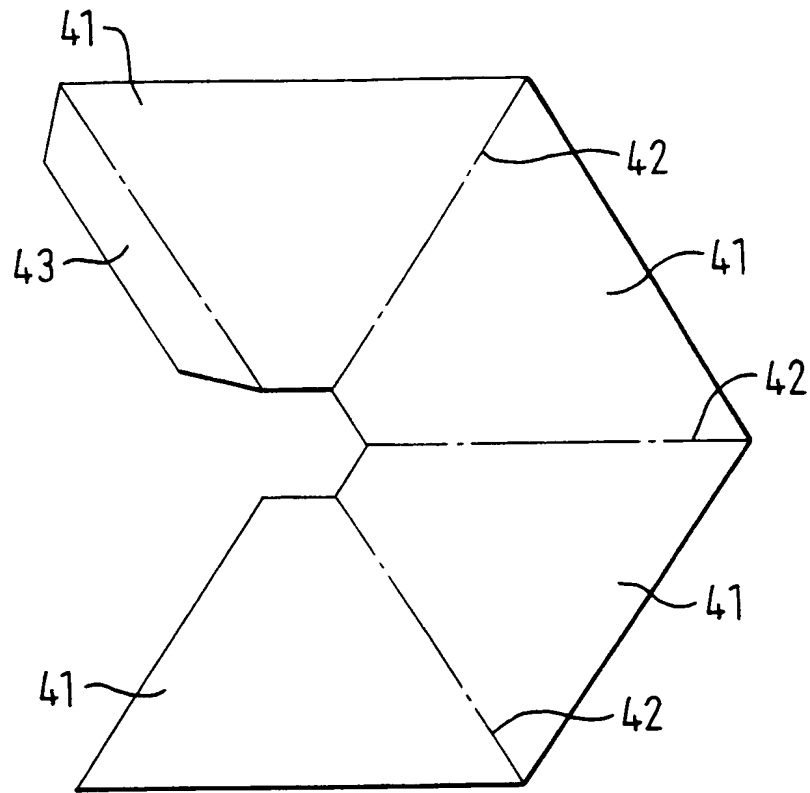


FIG. 4

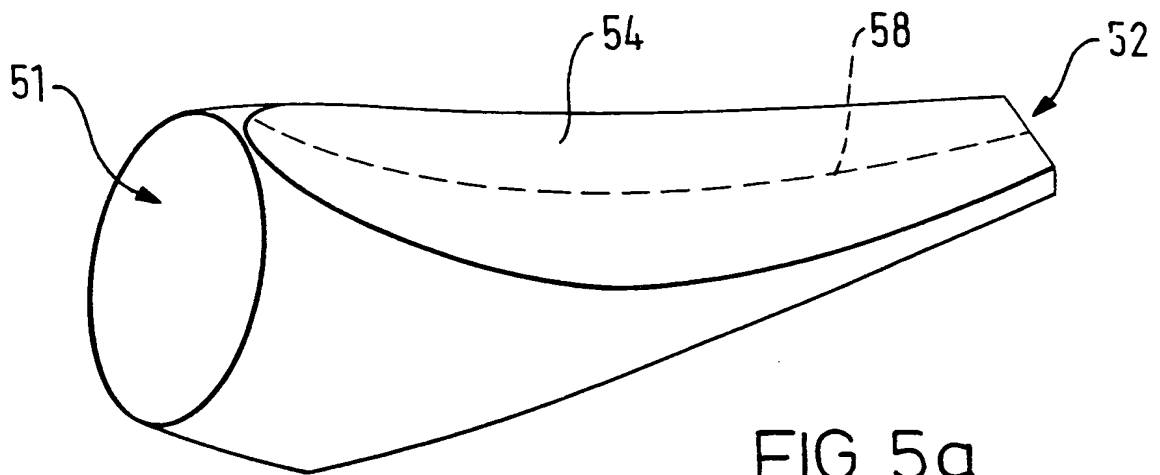
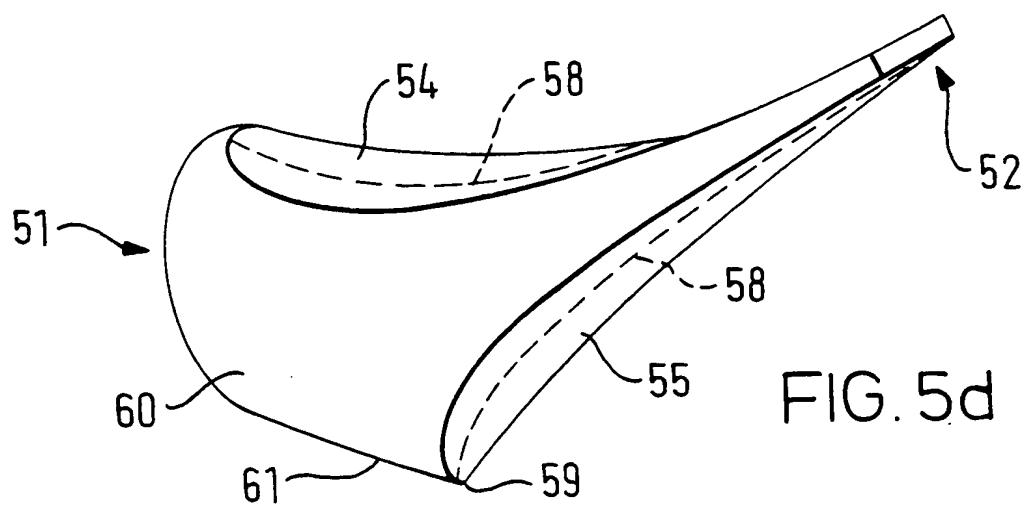
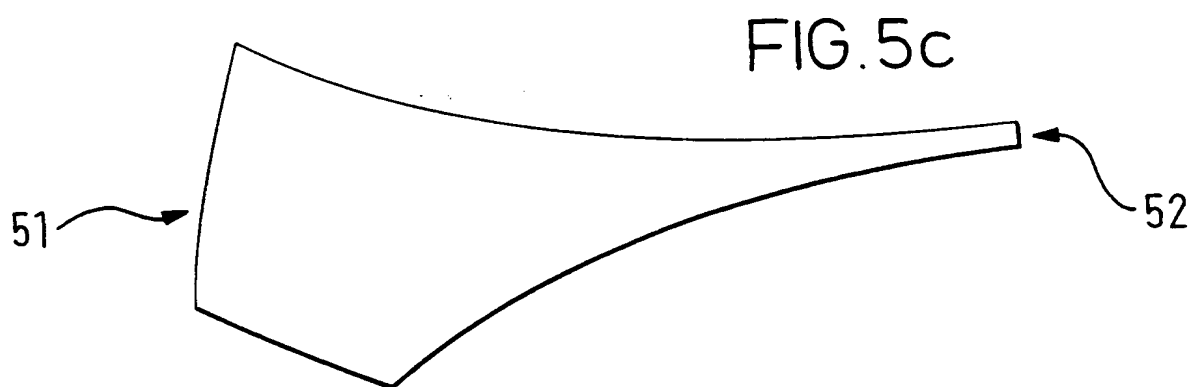
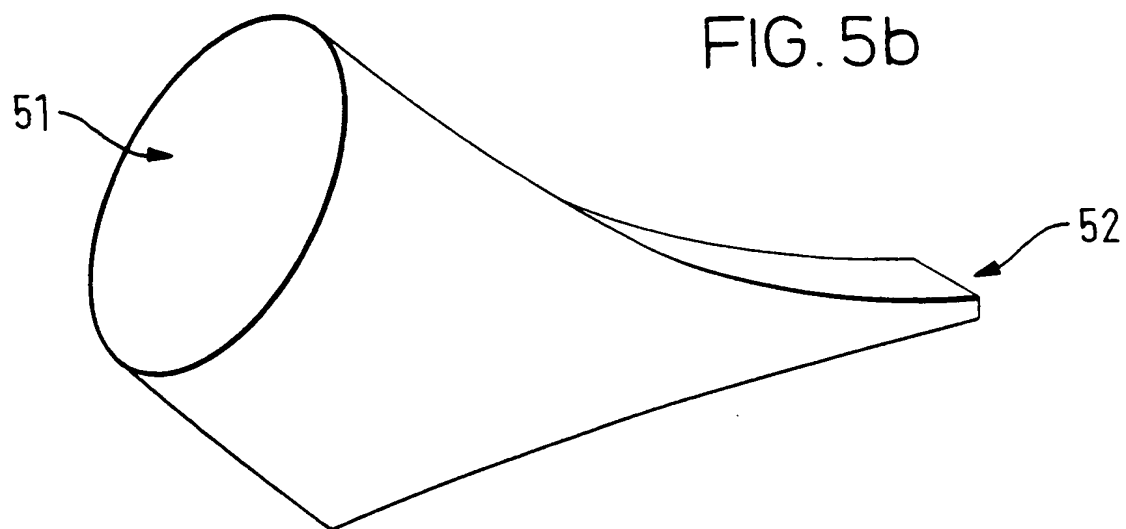


FIG. 5a

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FIG. 6

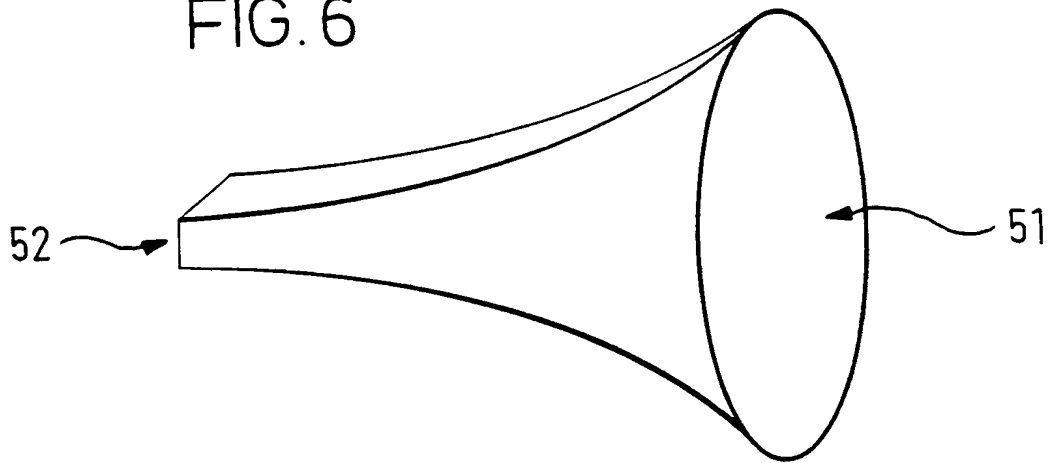
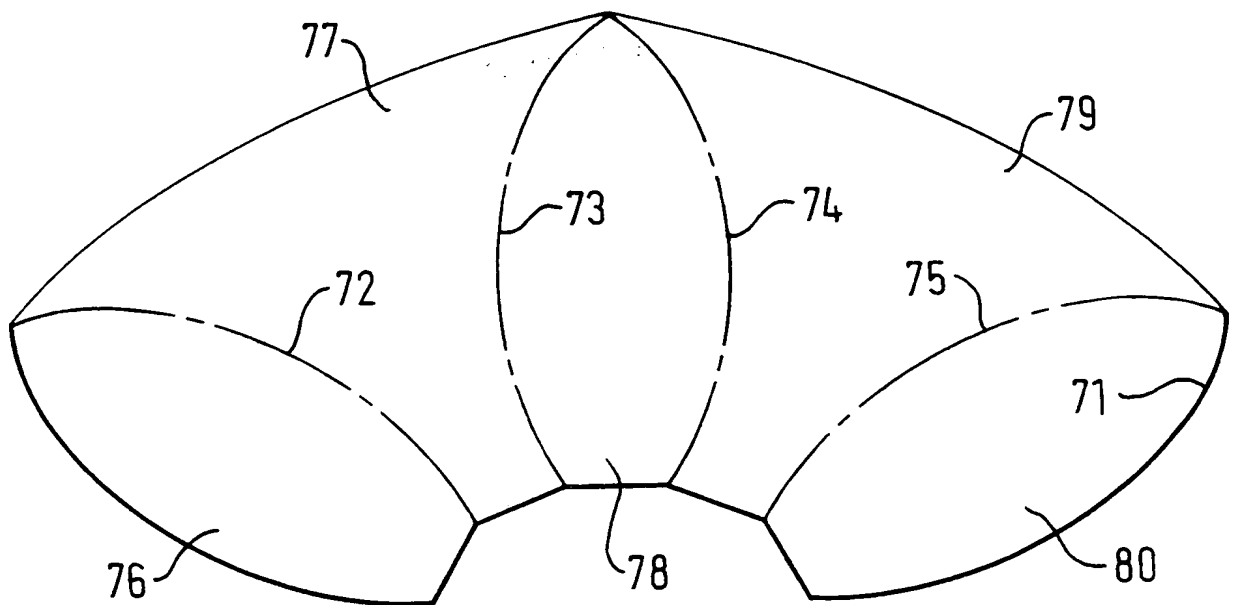


FIG. 7



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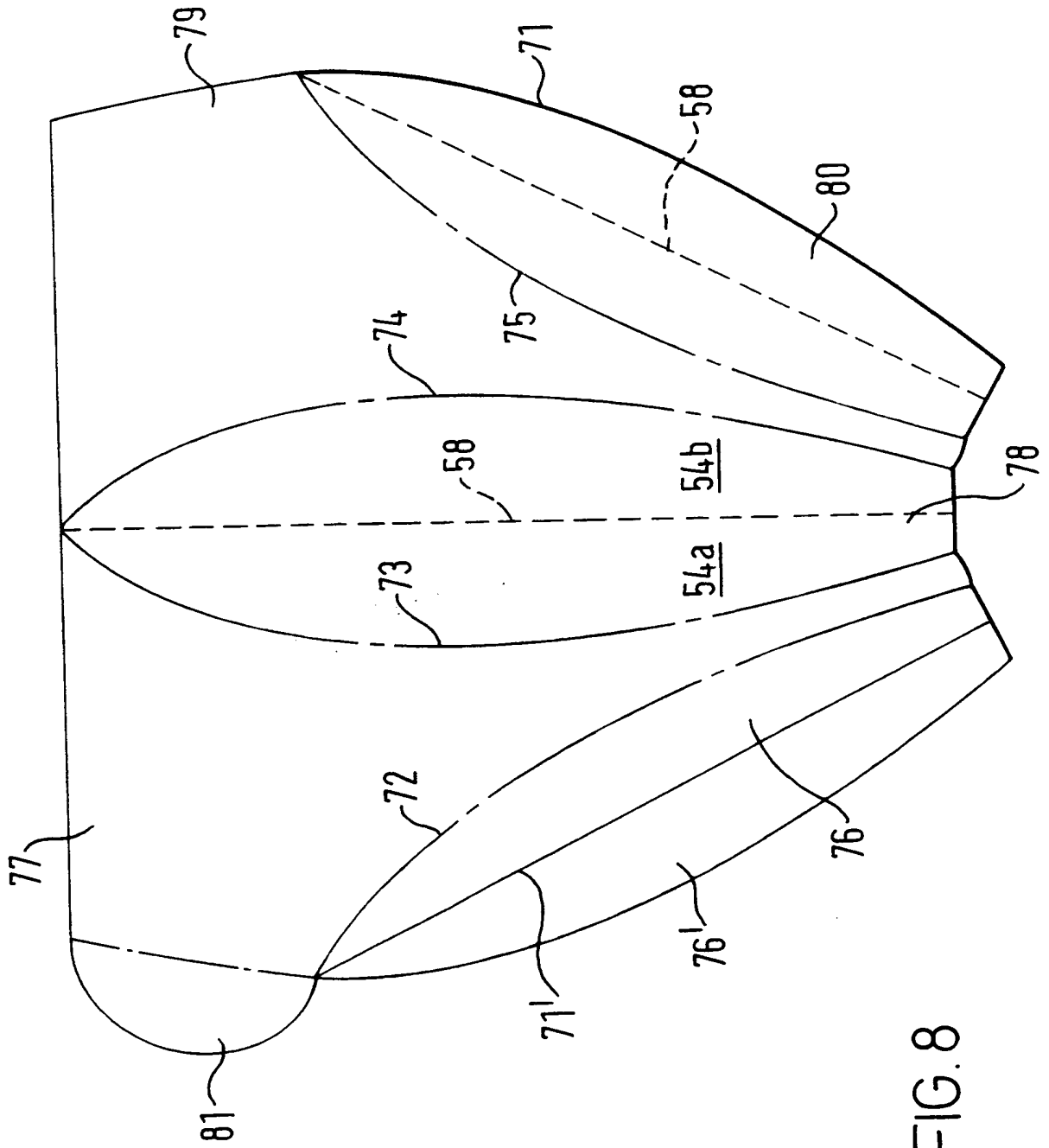


FIG. 8

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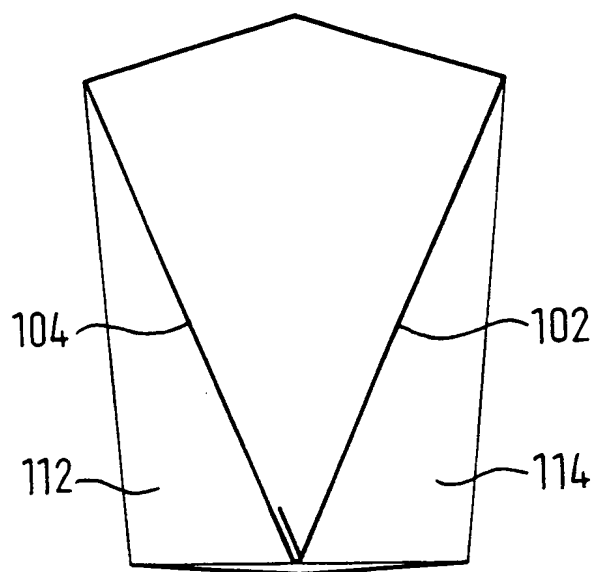


FIG. 9a

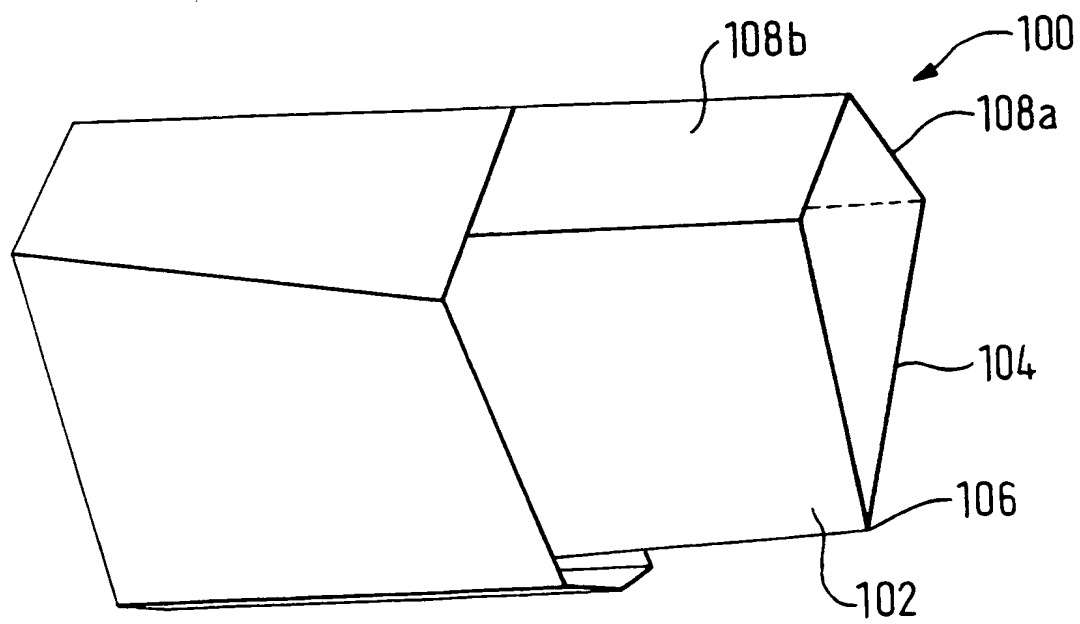


FIG. 9b

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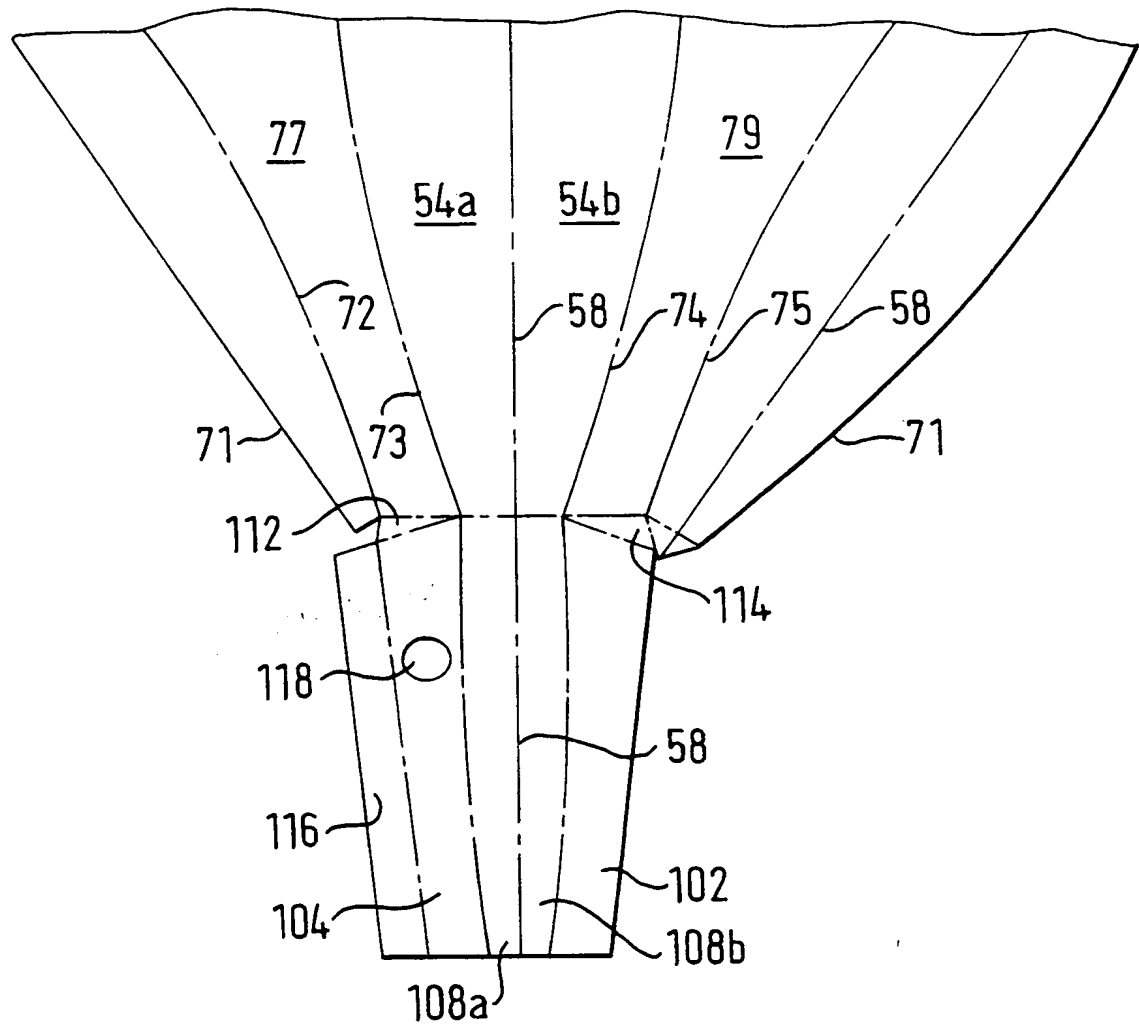


FIG. 10

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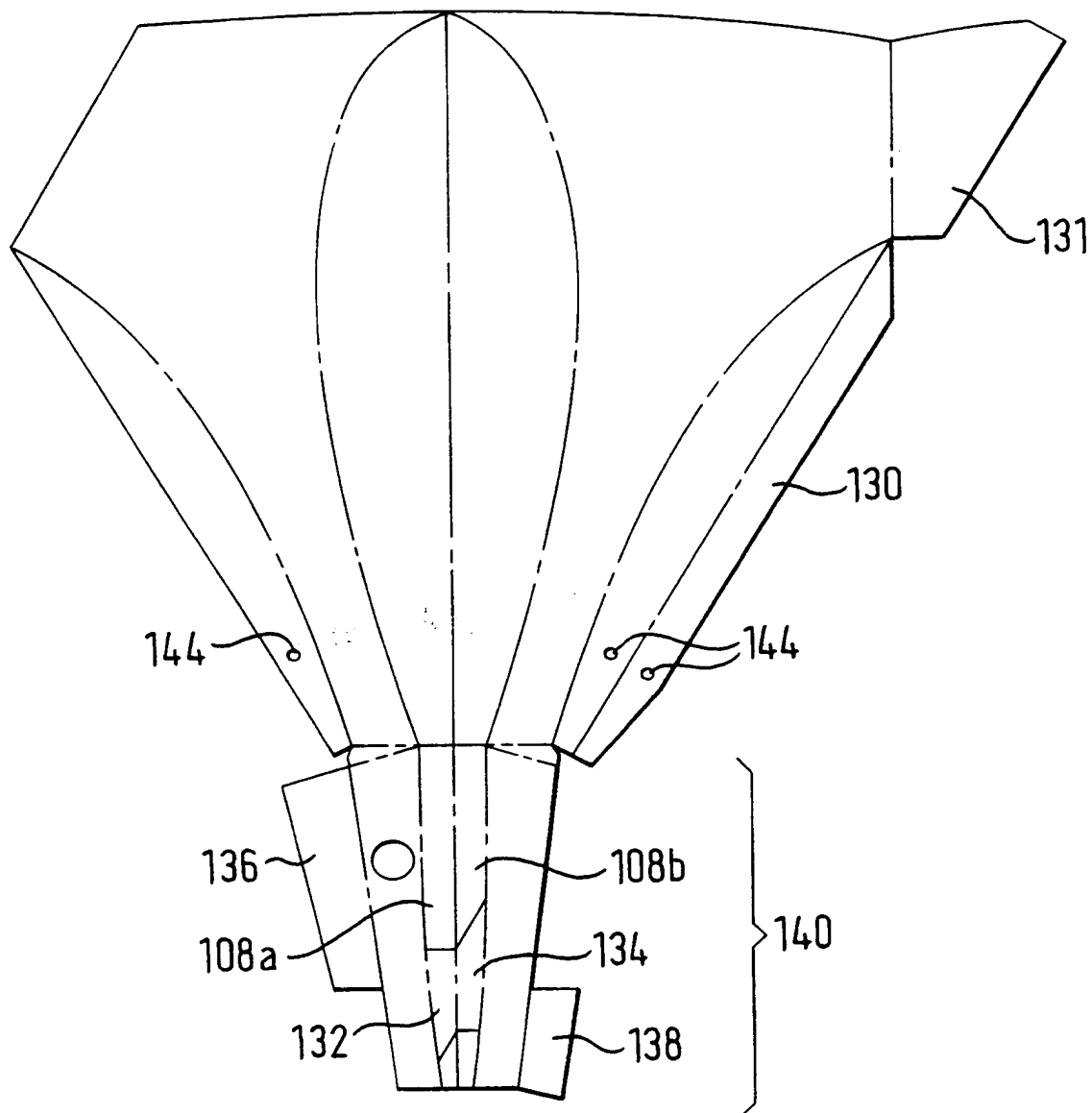


FIG. 11

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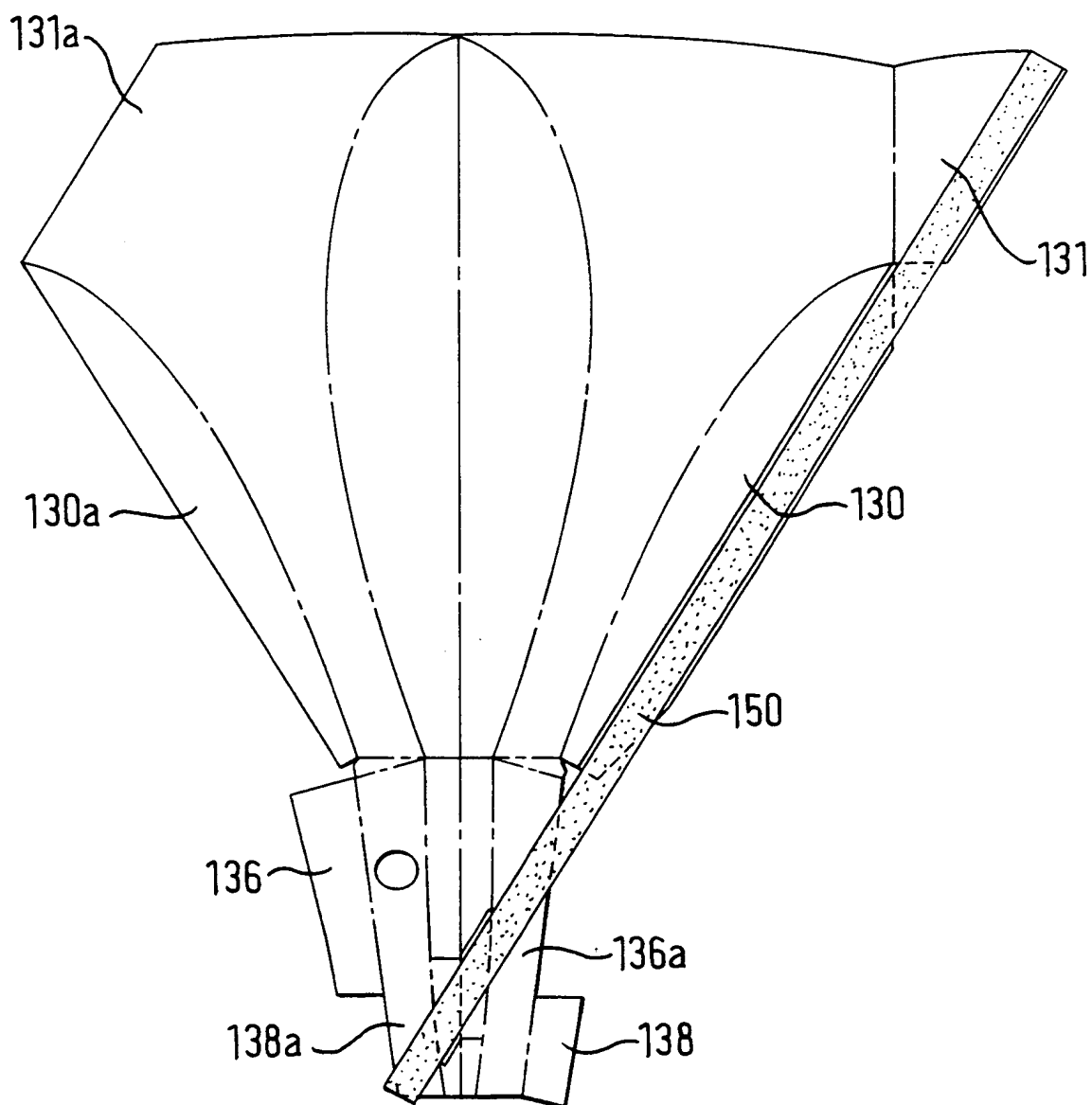


FIG. 12

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10/12

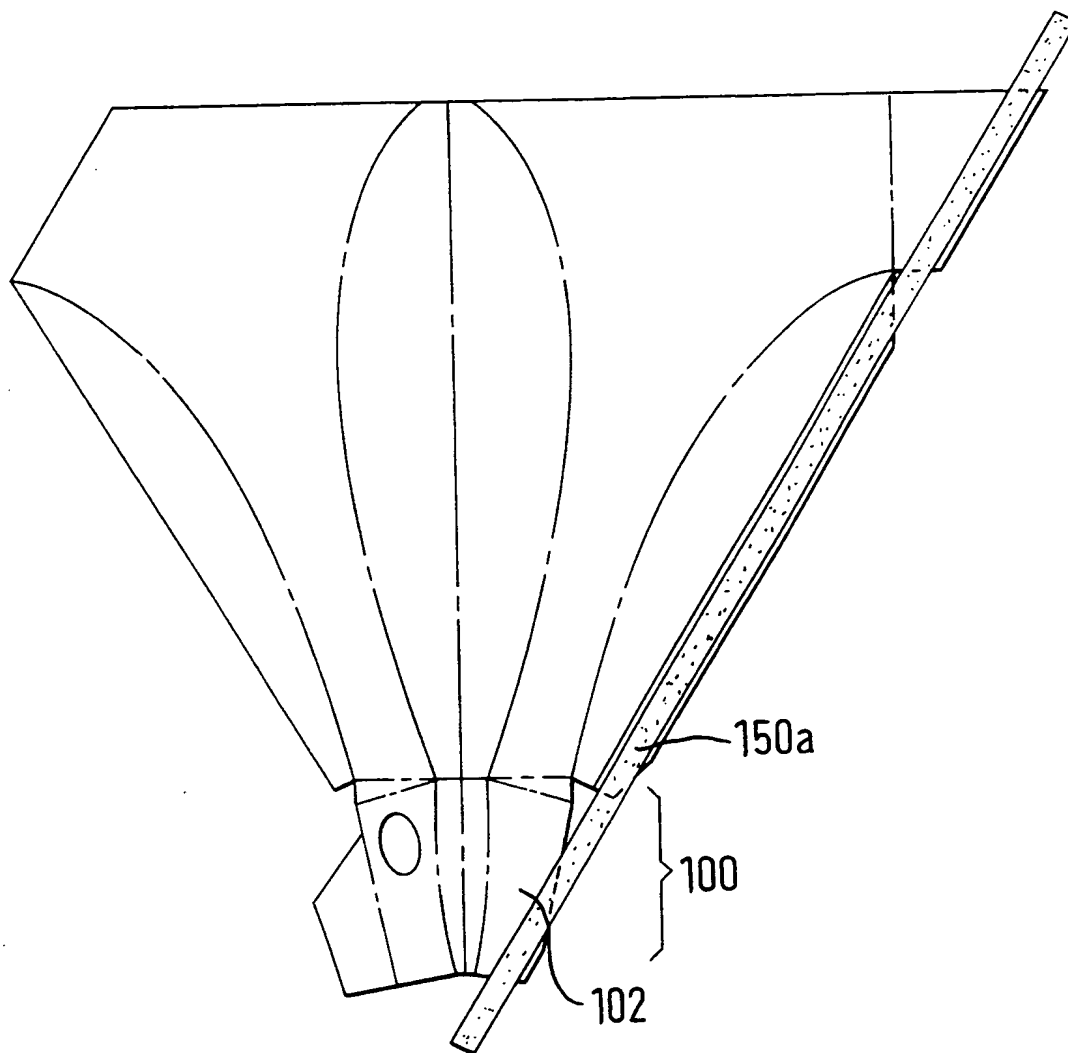


FIG. 13

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11/12

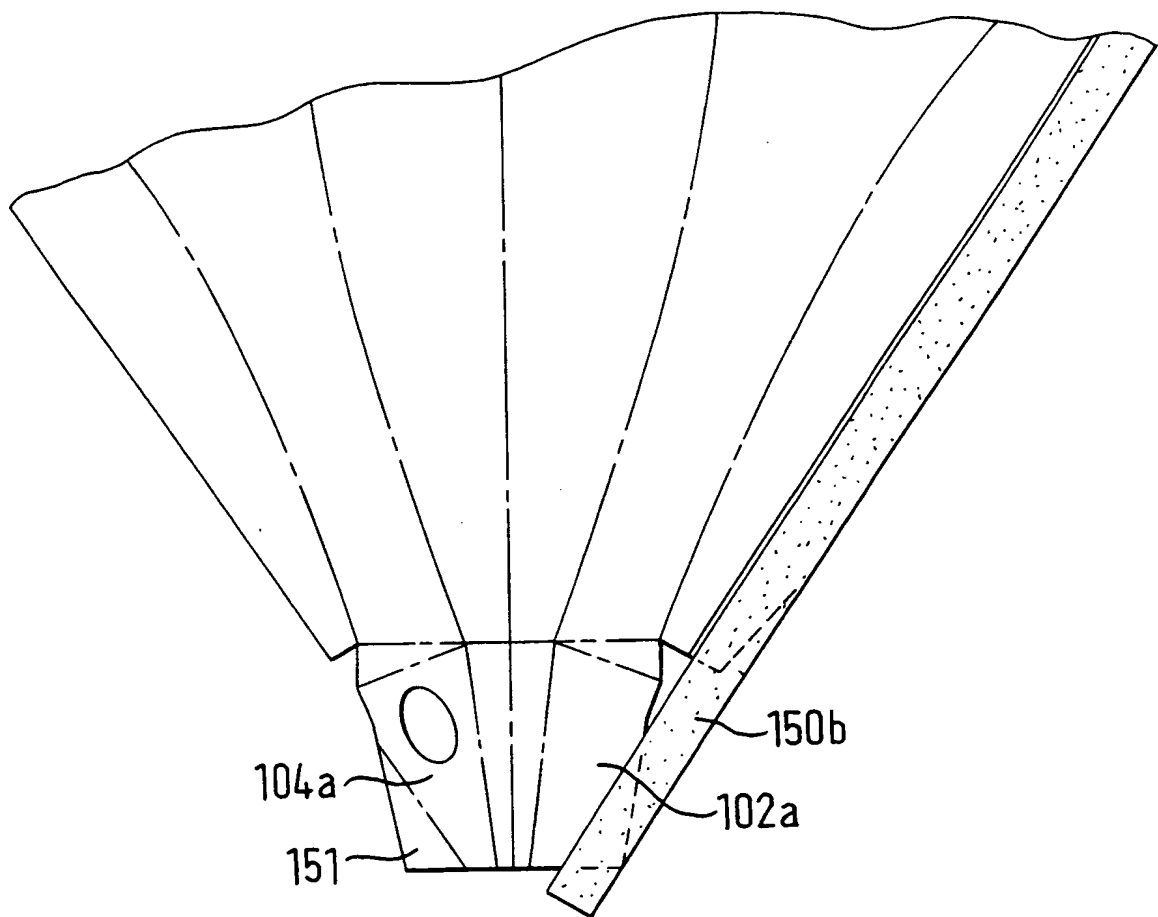


FIG. 14

7

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12/12

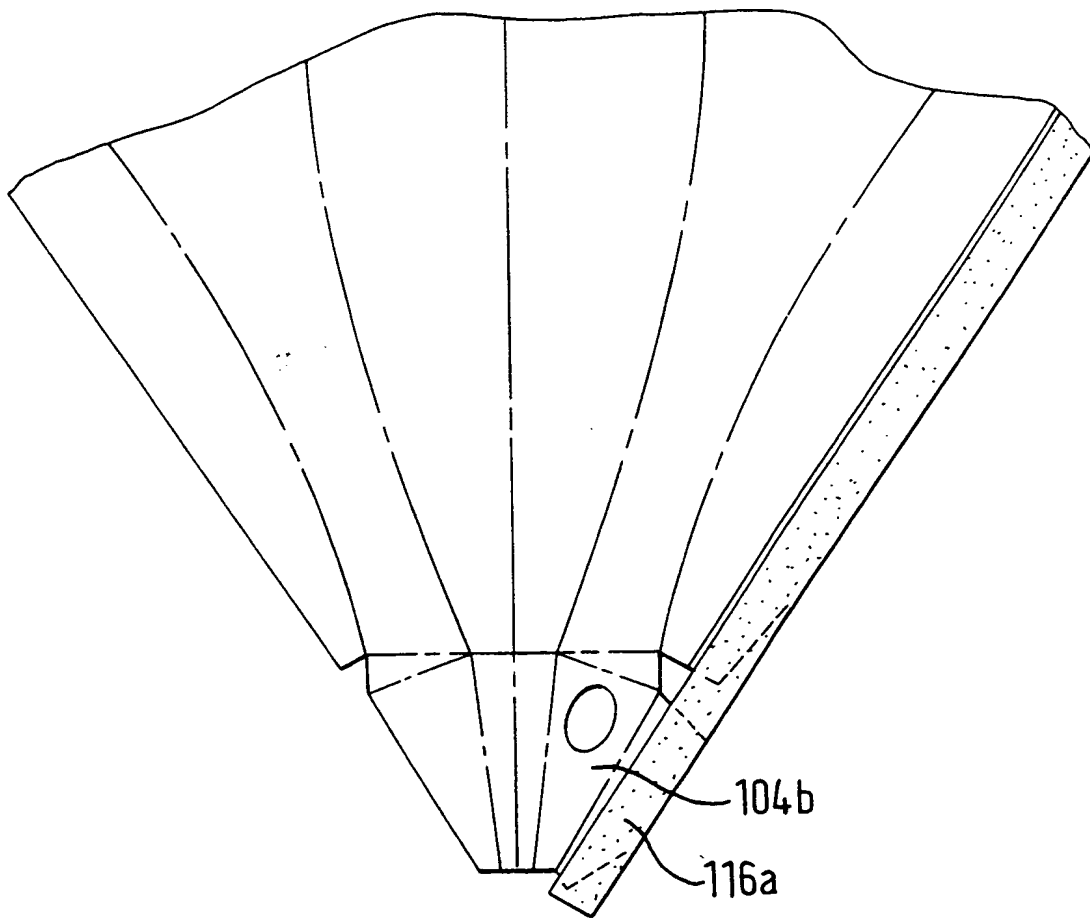


FIG. 15

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REC'D 24 JAN 2000

WIPO PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P1298	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/01245	International filing date (day/month/year) 22/04/1999	Priority date (day/month/year) 27/04/1998
International Patent Classification (IPC) or national classification and IPC A43B7/18		
Applicant SEYMOUR, Keahinuimakahahahaikalani Howard		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 4 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 18/11/1999	Date of completion of this report 19.01.2000
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Amery, M Telephone No. +49 89 2399 2074 

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/01245

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-11 as originally filed

Claims, No.:

1-27 as originally filed

Drawings, sheets:

1/9-9/9 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/01245

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-27
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-27
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-27
	No:	Claims	

2. Citations and explanations

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/01245

- 1) The closest prior art document (D1) forms the basis of the preamble portion of claim 1.

D1 discloses a footwear support structure comprising a lower sole part linked to an upper leg part, resilient spring means being provided connected to the upper and the sole part.

Problem: to provide an improved spring shoe means.

The solution according to the invention (see Claim 1) provides a shoe structure in which a primary lever is pivotable on said structure and biased away from the sole portion, a second lever being pivotable on the primary lever, and also biased away from the sole.

This solution is not disclosed or suggested by the prior art available.

Claim 1 therefore satisfies the requirements of Articles 33(2) and 33(3) PCT.

- 2) The dependent claims 2-27 contain particular embodiments of the device of Claim 1, and are therefore also considered to meet the requirements of Articles 33(2) and (3) PCT.
- 3) The word "from" has apparently been used erroneously in claim 1 at line 5. The word in question should read "for" (Art. 6 PCT).

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference ---	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/00977	International filing date (day/month/year) 29/03/1999	Priority date (day/month/year) 22/04/1998
International Patent Classification (IPC) or national classification and IPC D06F39/08		
Applicant MONOTUB INDUSTRIES PLC et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 03/11/1999	Date of completion of this report 05.01.00
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Auer, H Telephone No. +49 89 2399 2054 

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/00977

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-8 as originally filed

Claims, No.:

1-13 as originally filed

Drawings, sheets:

1/2-2/2 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB99/00977

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-13
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-13
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-13
	No:	Claims	

2. Citations and explanations

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/00977

ad V:

1. Most relevant prior art document is DE-A-4 202 760, which discloses a washing machine with a rotatable drum having a number of channels extending substantially along its length and with a pump arranged to pump water into the channels.

The problem of the invention is to ensure that water is spread over all the items in the drum so that all items are wetted sufficiently with minimum water usage.

The solution is given by the combination of features of claim 1, i.e. in particular that water provided by the pump is directed by valve means towards the channels in the upper half of the drum and from there drops onto the items of the drum.

There is no hint in DE-A-4 202 760 for this solution nor in the other documents cited in the search report which disclose only technological background.

Claim 1 is, therefore, in line with Articles 33(2) and (3) PCT.

2. The subject-matter of the dependent claims contain further embodiments of the invention and is also in combination with the independent claims novel and inventive (Articles 33(2) and (3) PCT).

ad VIII:

3. The independent claims are not properly cast in a two part form, with those features which in combination are part of the prior art being placed in the first part.
4. The documents cited in the search report (see point 5) are not identified in the description and the relevant background art disclosed therein is not discussed.

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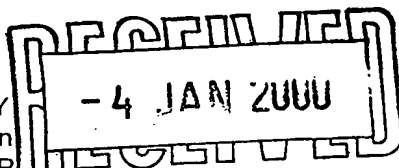
From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

P/23352.WO
ICB

PCT JRECS

To:

BAILLIE, I.C.
LANGNER PARRY
52-54 High Holborn
London WC1V 6RR
GRANDE BRETAGNE



NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing
(day/month/year)

28.12.1999

Applicant's or agent's file reference
23352.WO/ICB

IMPORTANT NOTIFICATION

International application No.
PCT/GB99/00938

International filing date (day/month/year)
25/03/1999

Priority date (day/month/year)
27/03/1998

Applicant

LE PREVOST, Dominic

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer

Röhner, M

Tel. +49 89 2399-8856





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ATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 23352.WO/ICB		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/00938		International filing date (day/month/year) 25/03/1999	Priority date (day/month/year) 27/03/1998
International Patent Classification (IPC) or national classification and IPC G10K11/08			
Applicant LE PREVOST, Dominic			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 4 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application 			
Date of submission of the demand 11/10/1999		Date of completion of this report 28.12.1999	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Feron, M Telephone No. +49 89 2399 2478 	

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB99/00938

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-11 as originally filed

Claims, No.:

1-24 as originally filed

Drawings, sheets:

1/12-12/12 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/00938

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-24
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-24
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-24
	No:	Claims	

2. Citations and explanations

see separate sheet

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/00938

1. The prior art cited by the search report is:

- D1: US-A-4 166 565 (WEBINGER GEORGE P) 4 September 1979
- D2: DE 20 40 787 A (DAMKE G.) 24 February 1972
- D3: US-A-1 353 864 (THOMASSIAN D.T.) 28 September 1920
- D4: GB 519 577 A (RINKEL P.) 1 April 1940
- D5: FR-A-1 066 361 (FRENOY J.A.M.) 4 June 1954
- D6: FR 319 520 A (BLANCHARD M.) 14 November 1902
- D7: FR-A-2 763 736 (POLICON JEAN PAUL) 27 November 1998

2. The invention as claimed is novel and includes an inventive step over these documents for the following reasons:

D1, D4 and D5 disclose containers having a tapered structure, arcuate folding lines and non-planar panels, but do not suggest anywhere that these structures could be used as acoustic horns.

D3, D6 and D7 disclose conventional conical acoustic horns without folding lines.

D2 discloses an acoustic horn having non-arcuate folding lines and planar panels. It is made of a single sheet of foldable material. D2 (which is cited on page 2 of the application) is therefore the most relevant prior art document, but it does not disclose the arcuate folding lines nor the non-planar panels of Claim 1.

3. The features of Claim 1 which are not known from D2 could be found in D1, D4 or D5.

However the skilled person would have no incentive to look at air freshener cartons or other containers for finding new acoustic horn structures, because there is little in common between the field of acoustic instruments and the field of air freshener cartons.

The examiner is of the opinion that it takes an inventive mind to derive ideas for the former from knowledge of the latter, and therefore is of the opinion that all claims include an inventive step because they all refer to an "acoustic horn".

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P.B. 5818 - Patentlaan 2
2280 HV Rijswijk (ZH)
☎ (070) 3 40 20 40
TX 31651 epo nl
FAX (070) 3 40 30 16

Europäisches
Patentamt

European
Patent Office

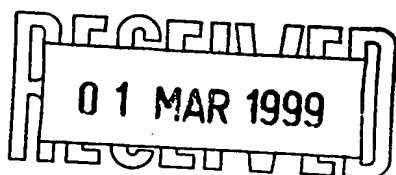
Office européen
des brevets

Zweigstelle
in Den Haag

Branch at
The Hague

Département à
La Haye

LANGNER PARRY
Attn. Mr. Iain C. Baillie
52-54 High Holborn
London WC1V 6RR
UNITED KINGDOM



Aktenzeichen/File No./No. du Dossier

RS 102370 GB

Datum/Date

20.02.99

Das Europäische Patentamt übermittelt hiermit den Standardrecherchenbericht zu dem unten bezeichneten Antrag; Kopien der im Recherchenbericht angeführten Schriften werden in der Anlage beigelegt.

The European Patent Office herewith transmits the Standard Search Report relating to the request indicated below; copies of the documents cited in the search report are enclosed.

L'Office Européen des Brevets à l'honneur de vous transmettre ci-joint le Rapport de Recherche concernant la demande désignée ci-dessous; des copies des documents cités sont jointes.

Zeichen und Datum des Antrages Applicant's reference and date Références et date de la demande	S.2260/ICB 20/01/99
Dokument, Gegenstand der Recherche Document subject of the search Objet de la recherche	GBA 9823529
Einreichungstag Filing date Date de dépôt	27/10/1998
Beanspruchte Priorität Priority claimed Priorité revendiquée	GBA 9806713 27/03/1998

OFFICE EUROPÉEN DES BREVETS
Pour le Vice-Président,

R. de Best

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DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
	<p>LACK OF UNITY OF INVENTION see sheet B</p> <p>On request of the client the search has been limited to the following claim(s): 1-11,16-28</p> <p>---</p>	
X	US 4 166 565 A (WEBINGER GEORGE P) 4 September 1979	1-4,6, 24-28
Y	* abstract; claims 1-5; figures 1-6 *	5,8-11, 16-18
A	---	7
Y	GB 519 577 A (RINKEL P.) 1 April 1940	5,8,9,11
A	* figures 32-35,41 *	10
Y	FR 1 066 361 A (FRENOY J.A.M.) 4 June 1954	10
A	* the whole document *	9,11
Y	DE 20 40 787 A (DAMKE G.) 24 February 1972	16-19
A	* the whole document *	21-23
Y	US 1 353 864 A (THOMASSIAN D.T.) 28 September 1920	19
	* figures 1,2 *	
A	FR 319 520 A (BLANCHARD M.) 14 November 1902	18,19, 21,22
	* the whole document *	
E	FR 2 763 736 A (POLICON JEAN PAUL) 27 November 1998	18,19, 21,22
	* the whole document *	
The present search report has been drawn up for all claims		
Date of completion of the search		Examiner
18 February 1999		De Bekker, R
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone</p> <p>Y : particularly relevant if combined with another document of the same category</p> <p>A : technological background</p> <p>O : non-written disclosure</p> <p>P : intermediate document</p> <p>T : theory or principle underlying the invention</p> <p>E : earlier patent document, but published on, or after the filing date</p> <p>D : document cited in the application</p> <p>L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>		

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European Patent
Office

**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

RS 102370
GB 9823529

The Search Division considers that the present patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-11, 16-28

tapered structure with special technical features of construction specifically for acoustical applications.

2. Claims: 12-15

tapered structure with special technical features of construction specifically for container applications.

The search has been limited to the invention first mentioned in the claims. A search for each of the other inventions can be carried out upon your request. For each additional invention a standard search fee will be due.

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ANNEX TO THE STANDARD SEARCH REPORT NO.

RS 102370

This annex lists the patent family members relating to the patent documents cited in the above-mentioned search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

18-02-1999

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4166565	A	04-09-1979	NONE	
GB 519577	A		NONE	
FR 1066361	A	04-06-1954	NONE	
DE 2040787	A	24-02-1972	NONE	
US 1353864	A		NONE	
FR 319520	A		NONE	
FR 2763736	A	27-11-1998	NONE	

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PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT
OR THE DECLARATION

(PCT Rule 44.1)

To: LANGNER PARRY Attn. BAILLIE, I.C. 52-54 High Holborn London WC1V 6RR UNITED KINGDOM
--

Date of mailing <i>(day/month/year)</i>	10/06/1999
--	-------------------

Applicant's or agent's file reference 23352.W0/ICB	FOR FURTHER ACTION See paragraphs 1 and 4 below
--	--

International application No. PCT/GB 99/ 00938	International filing date <i>(day/month/year)</i>	25/03/1999
--	--	-------------------

Applicant LE PREVOST, Dominic

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland
 Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.


☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority  European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040. Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Jacobus Constant
--	---

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NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

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NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 23352.WO/ICB	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 99/ 00938	International filing date (day/month/year) 25/03/1999	(Earliest) Priority Date (day/month/year) 27/03/1998
Applicant LE PREVOST, Dominic		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

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☐ None of the figures.

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 99/00938

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 G10K11/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G10K B65D G10D G09F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 166 565 A (WEBINGER GEORGE P) 4 September 1979	24
Y	see abstract; claims 1-5; figures 1-6	1-8, 10-14, 19-23
A	---	9
Y	DE 20 40 787 A (DAMKE G.) 24 February 1972	1-6, 8, 14, 19-23
A	see the whole document	16-18
Y	US 1 353 864 A (THOMASSIAN D.T.) 28 September 1920 see figures 1,2	14
Y	GB 519 577 A (RINKEL P.) 1 April 1940	7, 10, 11, 13
A	see figures 32-35, 41	12
	--- -/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
 "E" earlier document but published on or after the international filing date
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
 "O" document referring to an oral disclosure, use, exhibition or other means
 "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
 "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
 "&" document member of the same patent family

Date of the actual completion of the international search

19 May 1999

Date of mailing of the international search report

10/06/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

De Bekker, R

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/00938

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	FR 1 066 361 A (FRENOY J.A.M.) 4 June 1954 see the whole document ---	12 11, 13
A	FR 319 520 A (BLANCHARD M.) 14 November 1902 see the whole document ---	2, 14, 16, 17
P, A	FR 2 763 736 A (POLICON JEAN PAUL) 27 November 1998 see the whole document -----	2, 14, 16, 17

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/00938

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4166565	A	04-09-1979	NONE	
DE 2040787	A	24-02-1972	NONE	
US 1353864	A		NONE	
GB 519577	A		NONE	
FR 1066361	A	04-06-1954	NONE	
FR 319520	A		NONE	
FR 2763736	A	27-11-1998	NONE	

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INTERNATIONAL COOPERATION TREATY

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NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C.20231
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 05 November 1999 (05.11.99)	
International application No. PCT/GB99/00938	Applicant's or agent's file reference 23352.WO/ICB
International filing date (day/month/year) 25 March 1999 (25.03.99)	Priority date (day/month/year) 27 March 1998 (27.03.98)
Applicant LE PREVOST, Dominic	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
11 October 1999 (11.10.99)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<p>The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No.: (41-22) 740.14.35</p>	<p>Authorized officer C. Carrié</p> <p>Telephone No.: (41-22) 338.83.38</p>
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